

Unique Patient Identifier for National Ehealthcare Service Delivery: The Indian Approach

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Abstract— The main objective of the present day eHealthcare is the integrated, interfaced health information systems or networks that should be able to gather, parse, and ensemble the different parts of the medical record pertained to a patient without involving any risk of linking those of another patient. Identifying the multiple fragmented pieces of a specific individual patient data existing in disparate distributed systems for the purposes of exchange remains a challenge though appears to be easy to reach. Many of the countries adopting HL7 family of standards prescribe the Social Security Number or an equivalent or any demographic data of a patient as the Unique Patient Identifier as a data element in the PID division of the EHR. Tagging the distributed data sets with mere numbering needs additional information to confirm the identity of an individual patient and involves many risks. Aadhaar Number concept proves to be a best fix as the UPI. The present paper discusses the related facets to the concept of UPI and the relevance of the Indian Aadhaar Number.

Keywords— Health Level 7; EHR; Unique Patient Identifier; Master Patient Index; Aadhaar Number.

INTRODUCTION

The presence of a Unique Patient identifier in the header section of the EHR is vital for the day-today operation of myriad eHealthcare facilities that include the delivery of care, administrative processes, support services, record keeping, information management, follow-up and preventive care [1]. Continuity of care of patients depends on the availability of complete healthcare information on which current and future care can be planned and implemented. Every patient has his demographic as well as clinical data residing in multiple records either within the database of an institution or multiple databases - often unknown by the institution or the individual care provider [2]. One of the main objectives of the present day eHealthcare is the integrated, interfaced health information systems or networks that should be able to gather, parse, and ensemble the different parts of the medical record of a patient without involving any risk of linking those of another patient. Identifying the multiple fragmented pieces of data pertained to a single patient existing in disparate distributed systems for the purposes of exchange remains a challenge though appears to be easy to reach.

The eHealthcare system increasingly requires healthcare professionals to access patient information from

distributed, disparate database systems held in a variety of electronic formats, represented as mixtures of narrative, structured, coded and multimedia entries [3]. Accessing specific patient information by either the patient concerned or the authorized stakeholders involves basically standards-oriented, integrated Electronic Health Record, data interoperability and exchange of patient information across databases. A robust EHR as the foundation to eHealthcare provides healthcare and wellness tracking information to all the stakeholders besides information generated from all ehealthcare events and interactions along with role-based access strictly adhering to privacy and security regulations using mobile devices and related ITs. This paper discusses the various facets related to the fixing of a patient identifier unique in nature.

As per HL7 SDO, a unique Patient ID is a basic requirement to identify the data generated by the patients, wearable electronic devices, laboratory results, physician prescriptions, billing and payments, insurance claims and the like pertained to a specific patient distributed over a network of related databases. The unique patient identifier as a primary key helps to integrate such identified data linking them into the relevant EHR of the patient for further process of healthcare.

DATA LINKAGE

“Each person in the world creates a Book of Life. This Book starts with birth and ends with death. Its pages are made up of the records of the principal events in life. Record linkage is the name given to the process of assembling the pages of this Book into a volume [4].” Dunn’s far-sighted view expressed rather prophesized on medical record linkage some 75 years ago is astonishing. “Data linkage is a technique that connects pieces of information that are thought to relate to the same person, family, place or event. Connecting sets of data can provide a more complete picture of how certain factors interrelate and impact across a variety of domains.” Data linking requires a unique identifier for efficient retrieval of data.

MASTER PATIENT INDEX AND THE UNIQUE PATIENT IDENTIFIER

The master patient index (MPI) is one of the most important components within the eHealthcare system. The MPI identifies a specific individual patient with an assigned, unique identifier across the distributed disparate healthcare management systems. The MPI allows every patient to be represented only once under a unique label so that patient’s complete dataset can easily be obtained. In an integrated Electronic Health Record (EHR) environment, the MPI is a database of patient information that includes patient name, date of birth, gender, social security number or its equivalent, address, phone number, insurance information and other Admission, Discharge and Transfer (ADT) data used in the registration and billing processes. To achieve a hassle-free patient data exchange and interoperability, each individual patient should have a unique identifier (Patient ID) which is referred to as the Medical Record Number (MRN).

Whenever the patient reaches the healthcare facilitator, irrespective of the location or organization, the patient is always identified with the same MRN. This helps to organize and store all the information pertained to every individual patient in an easily identifiable, retrievable and usable manner that promotes ultimately the efficient treatment and further transactions including insurance.

SOCIAL SECURITY NUMBER : A FAILURE

Many developed nations adopt the Social Security Number (SSN) as a unique National Individual Identifier applicable also to the Individual Patient Identifier. The SSN is an auto-generated random number. The problem with the auto-generated Patient Identifier Number (PIN) used in the Patient Identifier Division of the EHR is that it changes every time whenever a patient moves away from one hospital to another or from one geographical location to another. Unlike the SSN, the Aadhar number for an individual in India is generated only once and it is a permanent record for the

whole life of an Indian. The Aadhaar card includes a specific number known as the Aadhaar Number besides biometric scales which are unique features of an individual and remain unabated for the whole life time of a person.

Identifying a universal PIN at the national level is more vital in promoting access to and exchange of specific patient data distributed over disparate systems and databases located at several local as well as remote locations. “Indeed as quoted in Bob Wachter’s book *The Digital Doctor* [5], UCSF Medical Center CIO Michael Blum called the SSN as the US Congress’s failure to establish a universal patient ID “the biggest single failure in the history of health IT legislation [6].” The anomaly in using the SSN lead to a lot of problems as it is not a fixed one for the life time of a patient. The same issue is reiterated by Munro. “One of several remaining challenges – unsolved by FHIR – is a key field called Master Patient Index – or MPI. FHIR is a “framework” that can easily support an MPI – but it isn’t an MPI itself. An MPI – any MPI – must be developed outside of FHIR (for use with FHIR) [7].” Designing and maintaining a difficult-to-duplicate and accurate MPI is a task of extreme importance since patient’s medical histories are usually linked to their MRN [8].

PROBLEMS OF USING DEMOGRAPHIC DATA AS UPI

The patient-centric care is the main objective of the eHealthcare system which creates and maintains an EHR for each patient. The most significant one among the various requirements to provide right information to the right patient is the unique patient identifier (UPI) which is preponderant for linking all the data pertained to a specific patient from across the distributed disparate systems. Because of the lack of a UPI healthcare providers typically rely on anyone of the demographic data of the patient to identify their medical records in the electronic health record systems. However, using anyone of the demographic data of a patient for patient information retrieval does not guarantee to be unique to an individual. Moreover, this approach takes more time to cross check a patient’s other data requiring human intervention which entails the possible risk of associating medical information with a wrong patient. A unique patient identifier tagged to patient records helps to build a standardized Master Patient Index that ensures a faster access to individual patient records.

The purposes of a “Unique Patient Identifier aims to (a) Minimise the clinical risks caused through misallocation or duplication of patient information; (b) Ensure that the patient record being viewed by a clinician is unique to the patient; (c) Resolve some of the barriers to safely sharing information across healthcare settings; and (d) Assist with long term follow up processes and clinical audit [9].” “Administrative health data is highly sensitive, containing

both medical and personal information collected about an individual during contact with health services and systems. The use of record linkage methods which implement privacy preserving techniques aims to satisfy privacy concerns regarding the release of named information, while allowing record linkage to take place [10].”

Great attention has to be paid to define the best identifiers to link medical records. A linkage using less informative identifiers could lead to linkage errors: it is essential to quantify the information associated to each identifier [11].

UNIQUE PATIENT IDENTIFIER : THE INDIAN APPROACH

Indian contribution to the development of HL7 standards is fairly good and appreciable in recent years. The interoperability and HL7 family of standards are the primary assumptions for the exchange of data/information from the perspective of eHealthcare communication. India is one in the group of the 55 member nations in the Standards Development Organization (SDO) of the HL7 which has given every member nation to modify the set of data elements prescribed in the Patient Identity of the HL7 Standards. HL7 standards are flexible in allowing the adopting nations a 20% to meet local variations. “The 80/20 rule of the FHIR means resources that exist in FHIR cover 80 percent of data elements used in existing healthcare systems currently. The remaining 20 percent are specific use cases that can be dealt with as FHIR extensions [12].” India has been contributing to the HL7 standards improvement under this 20% permission to meet local variation acceptable to universal application.

Aadhaar Number: Better Alternative

In 2016, the Government of India (GOI) published a revised edition of the CDA Standards for Government as well as Private health organizations and Hospitals in India. The most striking feature of the Indian parallel to the HL7 CDA is the inclusion of the Aadhaar card number as the Patient Identity (PID) in the EHRs [13]. The Aadhaar card includes the unique feature of the biometric scales of the individual. It is becoming the primary key for the basic identity for all economic, social and political purposes in India.

In a manner of concretizing the suggestions, at that time in 2016, came the version of the EHR and CDA2 standard satisfying the Indian context substituting certain data elements of the HL7 CDA standard. Of the set of data elements prescribed in the PID of the HL7 standard, it was the SSN (Social Security Number – for individuals in western nations) that rendered a possibility of an Indian parallel namely the Aadhaar number that proves to be a better alternative to the western SSN or any other equivalent in the European nations

that adopt HL7 for eHealthcare. In the context of the Indian Government’s participation in the activities of HL7 standards Development Organizations, it contributed meaningful and noteworthy alternative/substitution to the HL7 PID framework.

UNIQUE FEATURES OF THE AADHAAR NUMBER

In the process of structuring, the PID is the first step. One of the best among alternatives for the PID is the Aadhaar number of the Government of India from the national context of eHealthcare. “The PID has to be not only unique but also authentic with proven data with regard to the individuals. It should be not only identifiable with precision but also recognizable to the Government authorities as an individual identity beyond any doubt. The Government of India conceived the idea of Aadhaar number which is a unique form of identification of every individual linked to his/her demographic and biometric information. The features of this number are as follows: It is a randomly generated twelve digit number for every resident of India (Eg: 2345 1264 7438). This number is known as the Unique Identification (UID) Number or the Aadhaar number. To avoid misuse, the Aadhaar number avoids any additional information within its value or structure. It is a random number like the result of a lottery draw or like throwing a dice. Aadhaar is a proof of identity and not citizenship and independent of state affiliation [14].” Once issued, the biometric scales of an individual like finger-print, iris of the eye are for his life-time and never changes, except the address which is changeable on valid support of evidence.

Aadhaar project was introduced under the scheme ‘UIDAI’ (Unique Identification Authority of India) by the UPA (United Progressive Alliance) government in year 2009. Aadhaar card contains the demographic features such as name of the citizen, Father/Mother’s name, Date of Birth, Sex, address of the citizen, and biometric features such as photograph, fingerprints and iris (eye) details. The demographic features as well as in the form of Quick Response (QR) code along with a 12-digit unique identity number called, Aadhaar, are printed on the card issued to every citizen [15].” “All the demographic and biometric data are stored into one centralized database, and this project has been reported as a world’s largest database management and Biometric ID system respectively by Forbes 1 and The Times of India [16].”

CONCLUSION

India, as a member of the Standards Development Organization (SDO) of the HL7 group has been actively participating in coordination and conformance to the standards evolved from the HL7 group. India has released a report on the CDA standard from the Indian context in 2013 and revision of the same in 2016. While retaining a major portion of the data elements in the EHR, it has substituted

some items like race form the PID list. It has introduced Aadhaar Number as the prime key for the Patient Identity (PID). HL7 EHR standard relies on the random generated computer number as the PID which may change according to the geographical or hospital mobility of a patient. Instead of depending upon the computer system generated PID for individual patients for every event or occasion, the concept of the Indian Aadhaar Number is seen as the best among alternatives as the UPI.

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